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ABSTRACT

Integrated Learning Systems (ILS) can be used as instructional tools and to produce reports on student progress. Three different systems from Curriculum Computer Corporation (CCC), Ideal Learning, Inc., and Jostens Learning Corporation were piloted in three elementary school to evaluate ILS usefulness in reading/language arts and math. The pilot evaluation was to answer questions about ILS results in other school districts, implementation problems, day-to-day operations, instructional program and district goal correlations, staff and parent ratings, academic achievement improvements, and Chapter 1 instruction. Qualitative measures (classroom observations, implementation difficulties, and curriculum review) and quantitative measures (parent, principal, and staff surveys, pre-pre/post-skill test scores, and costs analysis) were used for evaluation. Test scores did not show major differences in achievement; however, teachers, parents, and principals stated that ILS had positive effects on children's learning. The Ideal program had the most weaknesses such as implementation and curriculum problems; CCC was more expensive but made more academic gains than Jostens. recommendations include continuing CCC and Jostens programs for another year and discontinuing the Ideal system. Standard deviations of test score comparisons and copies of surveys sent to parents and school staff are given. (8 references) (EJS)

INTEGRATED LEARNING SYSTEMS:
A School-Based Evaluation

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EXECUTIVE SUMMARY

The vendors and schools involved in the Integrated Learning System (ILS) pilot project in the Wichita Public Schools, 1989-1990 were:

Computer Curriculum Corporation (CCC)	Harry Street
Ideal Learning, Inc. (Ideal)	Cessna
Jostens Learning Corporation (Jostens)	Adams

Literature:

The literature supported ILS systems. CCC and Jostens were both reported as products which would meet needs in the reading, language arts, and mathematics areas.

Lab Implementation:

- CCC - No major problems
- Ideal - Problems with Podium software; not enough curriculum in primary grades.
- Jostens - Some software management problems which were easily remedied.

Curriculum:

- Reading - Jostens best for Heath; CCC for ITBS.
- Language Arts - CCC and Jostens both acceptable.
- Mathematics - CCC first choice; Jostens second choice.
- Chapter 1 - ILS not compatible with present objectives; CCC would be most compatible.

Participant Reactions:

- Principals - All supported ILS in general; their specific system in particular.
- Teachers - All supported CCC and Jostens; Few supported Ideal.
- Parents - Overwhelmingly supported all systems.

Informal Measurements:

CCC had highest gains in reading, math; Jostens in writing.

Standardized Testing:

CCC showed highest gains in reading, language, and math.

Cost:

CCC -	$451 per pupil first year	$81 subsequent years
Ideal -	283	47
Jostens -	405	77

Recommendations:

1. Discontinue Ideal at Cessna.
2. Continue with CCC and Jostens at Harry Street and Adams.
3. Study further these systems for cost and configuration possibilities and use in Chapter 1.
4. Plan to purchase CCC as first choice; plan for expansion to other schools if subsequent data so indicate.

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INTRODUCTION

Wichita Pilot

In 1988 a district committee composed of administrators and teachers studied the use of Integrated Learning Systems (ILS) as an instructional tool. The ILS committee recommendation was to pilot three systems from three vendors in three elementary schools for the 1989-1990 school system. The vendors and schools chosen were:

Curriculum Computer Corporation (CCC)	Harry Street
Ideal Learning, Inc.	Cessna
Jostens Learning Corporation	Adams

Integrated Learning Systems (ILS) can be defined as computer systems that provide instruction in several subject areas and include the production of reports on student progress. (Smith & Sclafani, 1989). Instruction which is generally individualized is distributed to a class of students via computer terminals or through a network of microcomputers.

The goal of ILS developers and users is that computers would:

- through software, provide masterful instruction, consistently and on demand;
- help organize and manage the individualization of instruction for millions of students;
- boost educational results nationwide and worldwide across all curriculum areas for all students;
- and <u>not to be forgotten,</u> create a new kind of service business that would create, market, and support the use of ILS systems by educators. (EPIE Institute, 1990).

For the Wichita pilot, instruction was limited to reading/language arts and math. Pupils in kindergarten through grade five were scheduled for 20 minutes in reading/language arts twice a week and 20 minutes in math twice a week. The CCC program varied at vendor request. Pupils received ten minutes of reading/language arts instruction and ten minutes of math instruction in one class period four times a week for grades one through five.

Evaluation Design

The Wichita ILS pilot evaluation was designed to answer the following questions:

1. What are the research and evaluation results from other school districts?

2. What are specific problems with implementation of the three systems? How do the systems operate on a day to day basis?

3. Are the instructional programs correlated with district objectives?

4. Is ILS a possible avenue for Chapter 1 instruction?

5. How do staff and parents rate the program?

6. Is there evidence of academic achievement as a result of the ILS programs in general and with each specific system?

To answer these questions, the following measurement strategies were developed:

<u>Qualitative Measures</u>

1. Observations:
The project evaluator will visit each grade level in each school at least once during the fall semester and once during the spring semester. The evaluator will note pupil behavior, classroom environment, implementation procedures, and visit informally with pupils, teacher, and lab attendant.

2. Project implementation:
The lab attendant will keep a log which notes computer downtime; service calls; factors affecting the computer hardware; what went well for pupils, lab attendant, and teachers; what was difficult for pupils, lab attendant, and teachers; other factors they feel important. The project evaluator will summarize this information.

3. Curriculum:
a. The curriculum coordinators for elementary reading, language arts, and math will review the program to determine how well each program correlates with district goals and objectives for their curricular areas.

b. Chapter 1 administrators will review the programs to determine the merit of utilizing the integrated learning systems for compensatory instruction.

Quantitative Measures

1. Surveys:
Surveys will be developed and sent to all teachers, administrators, and lab attendants at the end of the project year. A random selection of parents will be surveyed.

2. Heath Reading Placement Test: (grades 1-5)
The math inventory score will be utilized as a pre and post measurement to determine growth. Pretesting will occur between September 25 and October 13. Posttesting will occur between April 30 and May 18.

3. Harcourt Math Inventory: (grade 1-5)
The math inventory score will be utilized as a pre and post measurement to determine growth. Pretesting will occur between September 25 and October 13. Posttesting will occur between April 30 and May 18.

4. Language Arts Assessment: (grades K-5)
The USD 259 Language Arts Assessment for grades K, 1-2, and 3-5 will be utilized as a pre and post measurement to determine growth. The first assessment will occur by October 13. The final assessment will occur during the fourth period by May 18.

5. Iowa Test of Basic Skills: (grades K-5)
a. The ITBS reading, language, and math scores for each grade level from the spring 1990, administration will be compared with the spring 1989, scores in each school.

b. The ITBS reading, language, and math scores for each grade level from the spring 1990, administration will be compared with the scores of a comparable school. Factors used in identifying comparison schools were socio-economic status, similarity of programs, previous ITBS data, and size of school.

The comparison schools will be:

Adams--------Sunnyside
Cessna---------Funston
Harry Street--Franklin

Note: In calculating the statistical data, only scores for children who have been in a project school all year will be considered.

6. Cost analysis:
A cost analysis for future implementation will be provided for each program. The analysis will include but not be limited to cost of hardware, software, consumables, lab setup and maintenance, and personnel.

School Differences

One of the problems associated with the evaluation of the ILS program was controlling for factors, other than the program itself, which may have influenced learning. In the ILS situation the three schools had very different demographic characteristics which may have caused differences in test scores and other measurements. Demographic characteristics for each site are listed below.

INTEGRATED LEARNING SYSTEMS
SCHOOL DEMOGRAPHICS

	CCC Harry Street	Ideal Cessna	Jostens Adams
Percent Free & Reduced Lunch 3-90	51%	34%	39%
Percent Minority Population 3-90	17%	28%	47%
Average Daily Percent Present 89-90	94%	90%	95%
Mobility Percent of Change 89-90	32%	16%	20%
Average Class Size 9-89	20	26	26
Total School Population 9-89	285	412	310

Vendor Descriptions

Each of the ILS products have some similar characteristics and some aspects which are specific to the vendor. Descriptions of each of the systems were prepared by Betty Roeser of Instructional Computer Services.

General Description:
An Integrated Learning System (ILS) includes a wide range of courseware with a sophisticated management system that can be tailored to district objectives. These systems use computers to diagnose, reinforce, and enhance learning. The systems monitor student achievement and provide documentation (reports) on student improvement.

Software:

Computer Curriculum Corporation: CCC offers curriculum in the areas of mathematics and science, reading, language skills, basic competency, and computer education. The system can give student, course, grouping, and gains reports. At the beginning of the year the students may take an Initial Placement Test to determine the level they need to start. The computer program keeps track of each keystroke the student makes; it evaluates, diagnoses and places the student in the next lesson. The teacher may choose to have the paraprofessional change the assigned lesson but most generally the computer places the student. It is a closed system because "the system" evaluates and diagnoses the progress and places the student on a daily basis.

Ideal Learning, Inc.: Ideal offers curriculum in the areas of language arts, reading, math science, foreign language, and basic skills. The system offers a filtering function that allows teachers and administrators to set criteria for selecting and grouping of students for any special requirements. An example may be to select all students between 10 and 12, who are in the sixth grade and scored below 70 on Unit 1 of sixth grade math. The teacher must prepare the student lesson plans and give them to the paraprofessional one week prior to the students going to the lab. The computer does not diagnose, prescribe and place the student. This is an open system because "the teacher" gives input daily.

Jostens Learning Corporation: Jostens offers curriculum in the areas of reading, mathematics, language arts, and science. The system can give student and class reports. It is a closed system because "the system" evaluates and diagnoses the progress and places the student on a daily basis. At the beginning of the year the student goes through the Basic Skills Inventory. This is used to place the student. The teacher may choose to have the paraprofessional place the student at a certain level or lesson but this does not have to happen.

Hardware

Computer Curriculum Corporation:

Hardware requirements at Harry Street for 1989-90
Server: Microhost, 40 Mbyte disk, 3 graphic servers, central station, printer
Workstation: 24 Atari 1040 with color, 1.25 Mbyte memory, mouse, and headsets
Hardware Choices Available: Atari, IBM. Tandy

Ideal Corporation, Inc.:

Hardware requirements at Cessna for 1989-90
Server: Macintosh SE/30 with 2 Mbyte memory, 40 Mbyte disk, printer
Workstation: 24 Apple IIe with color, 128K memory, and headsets
Hardware Choices Available: Apple

Jostens Learning Corporation:

Hardware requirements at Adams for 1989-90
Server: Macintosh SE/30 with 2 Mbyte memory, 40 Mbyte disk, CD ROM drive, printer
Workstation: 24 Apple IIgs with color, 1.25 Mbyte memory, mouse, and headsets
Hardware Choices Available: Apple, IBM, Tandy

To date there is no body of independently conducted longitudinal, quantitative research on the effectiveness of ILS systems. Most of the research and evaluation of ILS programs has been vendor supported. These evaluations show glowing results with children making academic gains. One needs to consider these results with caution because of the built in bias.

One independent study was conducted in the New York City Public Schools (Swan, Guerrero, Mitrani & Schoener, 1989) during the 1987-1988 school year. Thirteen vendors placed computers in 26 different schools at all levels. Results showed that computer instruction did make a difference in academic achievement, decreasing as the grade level increased. The program was most effective with the elementary special education students, least effective with high school regular education students.

The most comprehensive review to date was sponsored by the National School Boards Association and prepared by the Educational Products Information Exchange Institute (EPIE). EPIE is a consumer supported, not-for-profit organization chartered by the Regents of the State University of New York.

The evaluative study conducted by EPIE (1990) was qualitative in nature looking at eight vendor products. Courseware was evaluated for reading, language arts, and mathematics for grades K-8. Twenty-four urban, suburban, and rural school sites were visited for each of the systems studied. Students were observed using the ILSs, and interviews were conducted with teachers, students, administrators, and ILS lab managers at each site.

The study concluded: NO ONE IIS (i.e. ILS) STANDS OUT ABOVE THE OTHERS IN ALL DIMENSIONS. For each dimension, the top rated systems were chosen. These are listed in alpha order with only the vendors used in the Wichita pilot noted.

Price: Ideal

Management System:

- Ease of Use: Ideal
- Diagnostic/Prescriptive Capability: CCC
- Testing (non-diagnostic): None
- Scheduling Options: Jostens
- Reports: No clear leader - Ideal allows customization
- Word Processing: Jostens
- Third Party Software Availability: Ideal
- Customizing Lessons & Special Lesson Assignments: Jostens (automatic schedule mode only)
- On-line tools: CCC (not available in all courses)
- Other: Jostens - Alternative Pathways for remediation of specific skills

Courseware:

- Range of Curricula Coverage: CCC
- Overall Courseware Quality: CCC Jostens
- Imaginativeness and Creativeness of Teaching: Jostens
- Other: Jostens on-line network version of Compton's Multimedia Encyclopedia on a CD-ROM disc.

In addition specific curriculum areas were evaluated and the systems most worthy of consideration were listed (alpha order).

Reading

Word Identification Skills
CCC
Jostens

Comprehension Skills
CCC
Jostens

Whole Story Reading
CCC
Jostens

Language Arts

Writing as a Process
CCC
Jostens

Discrete Language Arts Skills
None

Writing as related to Reading
Jostens (grades 5-8 only)

Mathematics

Computational Skills
CCC
Jostens

Understanding and Applying Concepts
CCC
Jostens

Other conclusions from the EPIE study worthy of note were:

- Current market products are simply extensions of computer aided instruction and have not as yet reached the level of learner-adaptiveness needed.

- Most schools could be making more effective use of ILS through better staff training and better integration of the ILS into the larger curriculum and instructional life of the school.

- A wise choice of lab manager and adequate support by administrators can make a difference in implementation.

- There are many "hidden" on-going costs which vendors fail to stress.

- ILSs are perceived positively by students, teachers, and administrators.

- School staff state ILSs are beneficial to students in regard to motivating students, individualizing instruction, and increasing time on task.

EVALUATION RESULTS: QUALITATIVE MEASURES

Classroom Observations

The project evaluator visited each grade level at each of the three schools twice during the school year. Anecdotal data are reviewed below.

CCC Harry Street

- Students were most always busy with computers. A learning atmosphere was evident at most times.

- All lessons were individualized for students after placement based on computer testing.

- Some students worked through lessons faster than others. If there was not time for another complete lesson, computer was shut down amd these students then lined up.

Slower students were distracted and did not want to complete lesson.

- Children learned percentage of correct answers after each lesson.

- Children had to sign in name and number. Was difficult for younger children.

- There did not appear to be too many problems with hardware. They did exist, however, as with any technical system.

- Reports were extensive and were utilized by staff.

- The children wore headphones which, besides reinforcing with audio, seemed to keep them on task.

Jostens Adams

- All lessons were individualized based on testing by computer.

- Students were most always busy with computers. A learning atmosphere was evident.

- There seemed to be lots of minor bugs in system. These were rectified almost immediately by lab attendant and usually did not cause too much loss of time.

- The system operated on a strict timetable. There was no time flexibility. However this did allow students to work up to last minute. If there was not time to complete a lesson, the computer would automatically put in a filler.

- There were too many children in class for computers. Those who did not have a station sat at tables and read books or colored. Regular classroom instructional time was lost for these students when they later made up computer time.

- Teachers were able to use a "T-plug" i.e. putting in a lesson for entire class which reinforced classroom instruction. When this lesson was finished, system would revert to individualized lessons.

- The lab attendant developed many visuals and used special helps based on vendor suggestions.

- Reports were easily understood and were utilized by teachers on a regular basis.

- The program utilized headphones which kept children on task and reinforced information through hearing.

Ideal Cessna

- Program had no orientation session, nor placement testing, the teacher decided on lessons. Up until second semester, most teachers were giving same lesson to all students. After a directive from principal, teachers began using some individualization.

- There was not enough curriculum especially at lower levels. Students had been through same lessons several times.

- The lab attendant had to reset computers after each lesson.

- Students had to sign in whole names, which was difficult for lower grades. The system was slow coming on line.

- Students did not appear to be as attentive in this lab as with the other two systems. There was more disruptive behavior and time on task was limited.

- Some students would simply "punch through" the lesson without paying any attention to directions or answers.

- At upper levels, the math problems required paper and pencil for computations.

- Headphones were not added to the system until late in the year. They were not used in much of the software.

Personnel

The need for a qualified lab aide was evident in all programs. The need for the classroom teacher to be in the room helping with instruction was evident in all programs. As with any program, the learning environment was either enhanced or restricted by the abilities and endeavors of both the lab aide and the teacher.

Lab Implementation

Direct comparisons of program implementation is limited due to inconsistent recording of problems by the three lab aides. The lab aide for Adams recorded problems with the system throughout the year, Cessna more frequently during the first semester, and Harry Street only for September and October even though there were known problems later in the year.

Reports from Harry Street (CCC) were limited to September and October. The reports suggested that after a few minor technical adjustments, the system ran very smoothly. It should be noted that the project evaluator observed minor disruptions at other times.

Initial reports from Cessna (Ideal) indicated dissatisfaction with vendor service in getting the program up and running. Initial commands and processes needed clarification. Later problems were noted particularly at the kindergarten and first grade level. The management reporting system for K-2 was not useful to teachers. Several math and language arts lesson created problems and were updated the beginning of second semester. No problems were recorded after this time.

Numerous problems were reported at Adams (Jostens), most of which were solved by rebooting. Actual down time was most often attributed to electrical problems and power boxes. A major system error was reported in January, the system was updated and no other major system errors were reported. While the Jostens system appeared to have more problems recorded, the vendor technical support seemed to be sufficient to maintain a functional operational system.

Coordinator Input

The curriculum coordinators in reading, language arts, and mathematics were asked for input regarding the three systems. They were specifically asked for information as to correlation with district objectives, strengths and weaknesses of the three systems in relation to their specific curricular area, and the benefits for students. Responses from the coordinators are summarized below.

Reading

Both the Jostens and CCC programs contained adequate diagnostic, prescriptive and reporting systems. Jostens more directly complemented the elements of the Heath reading program. CCC more directly complemented the elements of the ITBS reading subtest. For purposes of raising standardized test scores and for promoting computer literacy, the CCC system contained a broader scope of program material for each grade level.

Language Arts

There was no direct correlation with language arts objectives by any of the systems. None of the programs utilized student's written products which are needed to address language arts needs. Ideal was unattractive to students as the language lessons were simply written

sentences with options for answers, listed on a blank screen.

All students could benefit from ILS systems. Gifted students will benefit the least from canned programs which involve only acceleration not enrichment. Children needing remediation will benefit from the drill. Regular education students will benefit from programs which include a variety of instructional methods.

Mathematics

CCC was the program which best met the mathematics needs of students. The program had great depth and scope, strong curriculum materials at all grade levels, and could administer to the wide range of student abilities. Other strengths of the program included comprehensive reports, diagnostic capabilities, and a superior tutorial program.

Jostens was next best in meeting the mathematics needs of Wichita students. The system had excellent graphics, prescriptive abilities, and good reports on student achievement.

Chapter 1 Input

In many urban districts, ILS systems are already playing a role in compensatory instruction. Some school districts utilize the systems as a supplement, others are utilizing the systems with limited additional teacher intervention. Results of the various models have yet to be analyzed.

The EPIE report stated:

> although the up-front cost of an ILS may appear high, when amortized over a period of five years, the anticipated result should prove to be quite cost-effective. If the cost is added to the regular Chapter I personnel costs, most programs will not be able to afford ILSs. If funds become available by means of attrition, however, the combined services of an ILS and Chapter 1 teacher should prove both beneficial and cost-effective.

The Director of Chapter 1 for Wichita stated that current philosophies in reading and math compensatory instruction do not directly correlate with an ILS system. Reading is committed to preteaching utilizing the Heath language based approach. Math is committed to the use of manipulatives and motivational activities. The Director stated that the CCC system matched the priority objectives of Chapter 1 more closely than the other systems.

EVALUATION RESULTS: QUANTITATIVE MEASURES

Survey Results

Surveys were sent to all participating principals and teachers in March 1990. In addition all parents in the three ILS schools were surveyed. Responses are summarized below.

Principals

Each principal was supportive of ILS in general and the particular system in his school. All three principals stated ILS should be expanded to other schools in the district.

Teachers

CCC Harry Street. The nine teachers (70%) who responded to the survey all reported the ILS to be effective for most of their pupils and wanted to see the lab continued in the school. The majority of teachers stated that the CCC program was most effective for higher ability children and most effective in mathematics.

Eight of the nine responding teachers reported CCC was utilized mostly for reinforcement as opposed to instructional or remedial. Written comments from teachers indicated ILS provided a motivating teaching tool that developed students' self image and provided a highly useful record keeping system for assessing student progress.

Ideal Cessna. Ten teachers (56%) responded to the survey. Seven of these ten stated ILS was effective for most of their students; only five of the responding teachers wanted to see the ILS lab continued in the school. The majority of the teachers stated Ideal was most effective for lower ability children and most effective in mathematics. All of the responding teachers reported the program was utilized mostly for reinforcement.

Written comments indicated that Ideal had the potential of being an effective teaching tool, but too often had problems. Teachers were not satisfied that the program accomplished its stated objectives. The program caused confusion and frustration for both the student and teacher.

Jostens Adams. All permanently based teachers (100%) responded to the survey. There were two long term substitutes who were not asked to respond. All of the teachers reported ILS to be effective for the students and all wanted the program continued in the school.

The majority of teachers reported that Jostens was not equally effective for all ability levels but there was no consensus as to which group it was most effective. The majority of teachers reported that Jostens was equally effective in reading, language arts, and reading instruction and that Jostens was utilized mostly for reinforcement of instruction.

In written comments the teachers stated students were excited about learning and the program improved students' self-concept.

Parents

A total of 282 parents (35%) responded to the survey. Parents from all of the three schools were extremely supportive of the ILS programs.
Over 90% of parents indicated with positive responses that the program helped their child in both reading and math, that their child liked going to the computer lab, and that the program should be continued and expanded to other schools. The only positive response under 90% was from Cessna where 86% of responding parents reported their child being helped in reading by the ILS experience.

The written comments from each of the schools were again mostly positive. Some examples were:

CCC:

> I believe that computer lab has helped alot not only in learning but also in his interest in the school period. I would hope to see computer lab remain in schools & then some. School boards should not only be concerned of their learning ability but as well whether or not if their [sic] interested. Which can keep them coming back & accomplish more. Thank you for being concerned & helpful.

Ideal:

> I feel that all children should have experience on computers. I was very glad that my child could go to computer lab and I think every school should have this program.

Jostens:

> I have four kids at Adams and they all love the ILS computer lab. The lab has helped my K,1,2,3 grade kids. I think it is the best thing for the school.

Informal Measurements

Pre and posttesting using informal measurements were conducted at each ILS site. Pretesting occurred in the fall of 1989; posttesting occurred in the spring of 1990. Average gains were computed for each grade level at each school.

Reading

Teachers were asked to place their students on a reading level using the Heath reading series guidelines. The placement level involved both a silent reading test and teacher judgement. These placements were then converted to a numerical value for computing gain scores. The numerical value does not indicate grade equivalent, but rather a level gain More gain was expected at lower grade levels than at upper grade levels.

Average Reading Level Gains

Grade	CCC Harry Street	Ideal Cessna	Jostens Adams
1	2.73	1.93	1.80
2	1.59	2.02	1.31
3	1.12	.95	.87
4	1.06	.75	.06
5	1.42	1.20	.28

Language Arts

The locally developed USD 259 Language Arts Assessment was utilized for determining growth. Teachers were asked to mark students after the first nine weeks and again after the fourth nine weeks. The rating choices were: 1=superior progress; 2=satisfactory progress; 3=improvement needed. For purposes of this evaluation only gains from the writing assessment sample were computed.

Average Writing Assessment Gains

Grade	CCC Harry Street	Ideal Cessna	Jostens Adams
1	.53	.28	.47
2	.09	.45	.46
3	.23	.43	.48
4	.25	.07	.45
5	.33	.16	.09

Mathematics

Teachers were asked to administer the math inventory from the Harcourt math series. Gains were computed from the number correct. The numerical gain would be expected to be higher in the upper grades as the number of total number of problems increased.

Average Math Gains

Grade	CCC Harry Street	Ideal Cessna	Jostens Adams
1	5.20	4.00	6.30
2	5.95	5.58	2.42
3	6.52	8.16	4.12
4	12.20	10.94	11.12
5	18.42	11.11	8.35

Harry Street (CCC) showed greater gains in reading at four grade levels and in math at three grade levels. Adams (Jostens) showed greater gains in writing at three grade levels. One needs to consider these results with caution because of differing demographic characteristics of the schools.

Standardized Testing

The Iowa Tests of Basic Skills (ITBS) were administered to all grade levels in the three schools sites as well as three comparable schools in the spring of 1990. Results of reading, language arts, and math testing were compared to 1988-1989 results as well as the comparable schools.

1990/1989 Comparisons

These comparisons show the testing results of classes as compared to the previous grade level in the previous year. They are aggregate class grade equivalents which are not necessarily the same students nor are they students which were in each school all year long. To achieve a year's growth, a grade equivalent gain of 1.0 should be realized.

GRADE 1
Average Grade Equivalent Gains

	CCC Harry Street	Ideal Cessna	Jostens Adams
Word Analysis	1.5	1.0	0.5
Vocabulary	2.0	1.1	1.1
Math	1.7	0.7	0.8

GRADE 2
Average Grade Equivalent Gains

	CCC Harry Street	Ideal Cessna	Jostens Adams
Vocabulary	1.3	1.3	1.3
Reading	1.2	1.3	0.9
Math	0.8	1.3	0.8

GRADE 3
Average Grade Equivalent Gains

	CCC Harry Street	Ideal Cessna	Jostens Adams
Vocabulary	1.2	0.1	0.9
Reading	1.0	0.4	0.8
Math	0.9	0.2	0.5

GRADE 4
Average Grade Equivalent Gains

	CCC Harry Street	Ideal Cessna	Jostens Adams
Vocabulary	0.9	0.8	0.9
Reading	1.2	0.7	0.7
Language	1.3	1.4	0.5
Math	1.2	1.1	1.0

GRADE 5
Average Grade Equivalent Gains

	CCC Harry Street	Ideal Cessna	Jostens Adams
Vocabulary	1.9	0.7	0.5
Reading	1.8	0.9	0.1
Language	2.3	0.7	0.4
Math	2.2	0.8	0.7

The 1990/1989 data showed consistently greater gains than the expected 1.0 at Harry Street. Cessna gains were mixed with very low gains for grade 3. Adams showed consistent gains of less than the expected 1.0.

Comparable School Comparisons

Class Summary Data. Tables I, II, and III show each of the ILS school average grade equivalent compared with their control school grade equivalents. The average grade equivalent (GE) represented the entire regular education classroom at testing time, not just those who had been in the program all year.

Harry Street (CCC) had consistently higher GEs than the control school Franklin. Cessna (Ideal) had lower GEs than the control school Funston in over 2/3 of the measurements. Adams (Jostens) had lower GEs than the control school Sunnyside in over 2/3 of the measurements.

TABLE I

CCC
Average Grade Equivalent 1990

	WA	VOC	RDG	LANG	MATH
KINDERGARTEN					
Harry Street	K.8	K.7			K.8
Franklin	K.7	K.4			K.5
GRADE 1					
Harry Street	2.4	2.1	2.0		2.2
Franklin	2.2	1.6	1.6		1.9
GRADE 2					
Harry Street		3.0	2.8		2.8
Franklin		2.6	2.7		3.2
GRADE 3					
Harry Street		3.8	3.9	4.1	3.9
Franklin		3.9	3.9	4.0	3.7
GRADE 4					
Harry Street		4.9	5.0	5.5	4.9
Franklin		4.7	4.7	5.1	4.6
GRADE 5					
Harry Street		6.7	6.5	7.2	7.0
Franklin		5.4	5.5	6.0	5.4

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TABLE II

IDEAL
Average Grade Equivalent 1990

	WA	VOC	RDG	LANG	MATH
KINDERGARTEN					
Cessna	1.2	K.4			K.9
Funston	1.2	K.6			1.0
GRADE 1					
Cessna	2.1	1.6	1.6		2.0
Funston	1.9	1.9	1.7		1.8
GRADE 2					
Cessna		2.8	2.7		3.2
Funston		3.0	2.9		3.0
GRADE 3					
Cessna		3.8	3.7	4.1	3.7
Funston		3.8	3.6	4.2	3.8
GRADE 4					
Cessna		4.7	4.5	4.9	4.8
Funston		5.4	5.4	5.7	5.2
GRADE 5					
Cessna		5.5	5.9	6.1	5.7
Funston		6.1	6.0	6.3	6.1

TABLE III

JOSTENS
Average Grade Equivalent 1990

	WA	VOC	RDG	LANG	MATH
KINDERGARTEN					
Adams	1.2	K.8			1.3
Sunnyside	K.5	K.9			K.6
GRADE 1					
Adams	1.6	1.8	1.9		1.7
Sunnyside	2.3	2.0	1.9		2.1
GRADE 2					
Adams		3.4	2.8		3.0
Sunnyside		3.1	3.1		2.9
GRADE 3					
Adams		3.3	3.3	3.4	3.3
Sunnyside		4.6	4.5	4.9	4.1
GRADE 4					
Adams		4.9	4.8	4.7	4.8
Sunnyside		5.0	5.0	5.5	5.1
GRADE 5					
Adams		5.5	5.2	5.7	5.5
Sunnyside		6.2	6.3	6.3	6.3

Raw Score Data. Tables IV, V, and VI depict raw score ITBS data for only those students who had been in the ILS schools and the control schools all year. An independent t test was performed at the .05 confidence level for each subject area for each grade level.

There were 54 separate t tests calculated. Results were:

14 statistically significant for ILS
29 no statistically significant differences
11 statistically significant for control schools

In general all ILS schools showed more of the significant differences in the primary grades. Harry Street had the highest number of significant differences of all the ILS schools.

TABLE IV

CCC
Harry Street - Franklin
Mean Raw Scores

	WA	V	R	L	M
(N) KDG					
(25) Harry	25.0	20.8*			26.1*
(37) Franklin	23.2	18.8			23.0
	p=.280	p=.015			p=.006
(N) GRADE 1					
(55) Harry	35.4	16.6*	37.1*		21.2*
(38) Franklin	33.9	12.4	30.4		17.5
	p=.292	p=.001	p=.002		p=.000
(N) GRADE 2					
(35) Harry		15.7	41.3		21.2
(44) Franklin		13.8	39.4		24.0*
		p=.247	p=.482		p=.021
(N) GRADE 3					
(48) Harry		18.2	27.9	21.5*	26.5*
(37) Franklin		17.5	26.0	17.8	23.4
		p=.547	p=.367	p=.003	p=.018
(N) GRADE 4					
(44) Harry		21.1	30.6	23.1	28.0
(46) Franklin		21.3	29.7	23.1	26.0
		p=.873	p=.629	p=.987	p=.123

* Statistically Significant `.05 t test

* Harry Street

Kdg Voc, Mth
Grade 1 Voc, Rdg, Mth
Grade 3 Lang, Mth

* Franklin

Grade 2 Mth

TABLE V

IDEAL
Cessna - Funston
Mean Raw Scores

	WA	V	R	L	M
(N) KDG					
(64) Cessna	27.0	18.8			25.7
(74) Funston	26.2	20.3*			26.3
	p=.439	p=.007			p=.489
(N) GRADE 1					
(54) Cessna	33.8	13.2	32.4		19.9*
(65) Funston	32.6	15.1	33.8		17.6
	p=.259	p=.073	p=.490		p=.005
(N) GRADE 2					
(63) Cessna		14.3	40.0		23.5*
(69) Funston		15.7	41.9		20.2
		p=.199	p=.328		p=.000
(N) GRADE 3					
(50) Cessna		17.6	25.3	18.9	23.8
(67) Funston		18.3	25.9	20.4	23.3
		p=.468	p=.738	p=.242	p=.716
(N) GRADE 4					
(57) Cessna		21.1	28.0	21.7	26.4
(56) Funston		25.0*	34.2*	25.5*	28.7
		p=.001	p=.001	p=.003	p=.060

* Statistically Significant .05 t test

* Cessna		* Funston	
Grade 1	Mth	Kdg	Voc
Grade 2	Mth	Grade 4	Voc, Rdg, Mth

TABLE VI

JOSTENS
Adams - Sunnyside
Mean Raw Scores

	WA	V	R	L	M
(N) KDG					
(38) Adams	27.9*	21.2*			27.7*
(37) Sunnyside	24.9	19.0			23.4
	p=.015	p=.010			p=.000
(N) GRADE 1					
(41) Adams	29.7	14.6	35.2		17.2
(36) Sunnyside	34.8*	15.0	34.6		20.7*
	p=.005	p=.789	p=.791		p=.013
(N) GRADE 2					
(54) Adams	22.6	18.1*	39.6		22.0*
(44) Sunnyside	21.7	15.4	41.5		19.4
	p=.421	p=.042	p=.448		p=.014
(N) GRADE 3					
(47) Adams		15.3	22.1	15.7	19.6
(41) Sunnyside		21.7*	30.6*	23.6*	25.4*
		p=.000	p=.000	p=.000	p=.000
(N) GRADE 4					
(39) Adams		21.0	27.0	21.9	27.3
(36) Sunnyside		21.9	30.7	24.0	27.6
		p=.548	p=.103	p=.230	p=.854

* Statistically Significant .05 t test

* Adams		* Sunnyside	
Kdg	WA, Voc, Mth	Grade 1	WA, Mth
Grade 2	Voc, Mth	Grade 3	Voc, Rdg, Lang, Mth

Cost

Each vendor was asked to provide pricing information for their product in one 30 station laboratory if expanded to another school. The information was dated fall 1989 projecting 1990 costs. Per pupil cost were calculated using the average elementary enrollment of 350.

Vendor Cost

	CCC	Ideal	Jostens
Hardware	$69,578	$47,966	$55,036
*(Microhost)	50,050	29,000	54,600
Software	300	NC	NC
Manuals			
Support/ Maintenance	12,655	750	11,650
Installation	7,075	NC	NC
Inservice by Vendor	1,500	1,500	900
Total	$141,158	$79,216	$122,186
Per Pupil	403	226	349

Additional District Cost

	CCC	Ideal	Jostens
Wiring	$ 2,500	$ 2,500	$ 2,500
Telephone	650	650	650
Tables	NC	2,974	2,974
Salary/Para	12,000	12,000	12,000
Teacher Training	1,600	1,600	1,600
Total	16,750	19,724	19,724
Per Pupil	48	56	56
Grand Total	$157,908	$98,940	$141,910
Per Pupil	451	283	405

*CCC advertised that the microhost can serve several schools. If it were able to do this the cost would be cut. CCC also can be operated from a microserver. This hardware would need to be installed in each school, but again the cost would be lowered.

To sustain the program in schools after the first year, the following dollars would be needed. (Does not include inflation).

CCC	$28,405	81 per pupil
Ideal	16,500	47 per pupil
Jostens	26,800	77 per pupil

FINDINGS

Discussion

Integrated Learning Systems have moved into the forefront for providing learning experiences through technology. The literature supported ILS as a means of reinforcing classroom instruction and there was some evidence in this pilot to support this contention.

The test score data did not show major differences in achievement as a result of ILS after one year of testing. However staff and parents stated the systems had a positive influence on children's learning and the interest level of children cannot be ignored.

All three of the systems piloted had strengths and weaknesses. The Ideal program at Cessna had the most weaknesses. There were implementation problems and curriculum problems or lack of curriculum problems. Teachers were given the responsibility of choosing lessons; they did not want this responsibility. Only one fourth of the teachers asked to have the program continue. The lessons were not automatically individualized. Children appeared inattentive in the laboratory when compared to behavior and time on task in the other labs.

The CCC and Jostens programs were somewhat similar. The curriculum was adequate to outstanding; the bells and whistles were all in place ensuring attentiveness of the children. The lessons were automatically individualized. Reports were sufficient and utilized by teachers. Teachers liked the programs and wanted them to continue.

What were the differences in the two programs? Cost, type of hardware, and test scores. CCC was the more expensive program. In addition to being more expensive, the system operated on Atari hardware making it incompatible with other district software. Jostens utilized Apple hardware which could run other educational software.

Students in the CCC program showed more academic gains both on informal measurements and standardized testing. The test score differences, however, must be considered in view of

several factors. First the pilot was conducted for only one year. To obtain an accurate picture of academic achievement, a longitudinal study must be conducted. How accurate a picture was presented by the measurement data for this one year is unknown.

Second, the schools themselves had very different demographics even though both had large numbers of at-risk students. The CCC site had a very low socio-economic population. The Jostens site had a very high minority population. The class size at Adams (Jostens) was much higher than Harry Street (CCC). Both third grades at Adams had a total of four substitute teachers per classroom beginning in February until the end of the year.

The Harry Street demographics have remained stable over the past years whereas Adams demographics have changed rapidly in the last two years. Separating the effects of program quality and demographic characteristics were not possible in this study.

Conclusions

ILS project. There appeared to be sufficient qualitative evidence in both the literature and this pilot to justify continuing with the ILS project.

CCC Adams. There were no major problems with lab implementation. The curriculum coordinators were all satisfied with the program. The Chapter 1 director stated this system was most compatible with Chapter 1 objectives. The principal, staff, and parents liked the program. Students always appeared attentive and interested. Achievement gains were documented by both informal measurements and standardized testing.

Ideal Cessna. There were numerous problems with lab implementation. None of the curriculum coordinators recognized the program as acceptable. Parents and the principal were supportive; staff were not supportive. Students were often inattentive. There were no discernable gains with either the informal measurements or the standardized testing.

Jostens Adams. There were a few problems with lab implementation but nothing major. The program was acceptable with the curriculum coordinators, although rated second choice by the math coordinator. Jostens was determined to be the most compatible with the Heath reading series by the reading coordinator. The principal, staff, and parents liked the program. Students always appeared attentive and learning. The test scores were disappointing for what appeared to be a quality program. On the informal

measurements, gains were shown in writing. There were no discernable gains shown on the standardized testing.

Final choice. The Ideal program should be eliminated from contention on the basis of both the qualitative and quantitative data. The remaining two programs, CCC and Jostens, both appeared to be acceptable from the standpoint of all the qualitative data and survey results.

The difference in test score data was evident with CCC showing higher gains. CCC was more expensive and the hardware was not compatible with district standard hardware. The two difference factors of cost and incompatible hardware could possibly be eliminated with different hardware configurations.

Test score data should not be the only basis for program evaluation and decision making. However in this pilot, about the only meaningful difference between two outstanding programs was the test score data.

Recommendations

1. Discontinue the Ideal system at Cessna.

2. Continue the present CCC and Jostens systems at Harry Street and Adams for one more year allowing principals to utilize the programs in different ways.

3. Plan to purchase CCC as the district choice for an ILS. Study the cost information of various configurations to determine the economic feasibility of such a purchase. If the cost is not feasible, the district may want to reconsider Jostens or study the two programs a second year to determine if the test data remain the same. This would, however, delay implementation for two years.

4. Plan for expansion of ILS to other schools with large numbers of at-risk children.

5. Investigate the possibility of utilizing ILS as an extension of Chapter 1 instruction. The reinforcement aspect of the system should work well as part of Chapter 1.

6. Incorporate into expansion plans the inservicing of teachers and screening of lab aides for ability, adaptability, and resourcefulness. Teachers need to remain with their students in the lab setting. A lab attendant is a necessity for smooth operation of the system.

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STANDARD DEVIATIONS

		CCC		IDEAL		JOSTENS	
		HARRY	*FRANKLIN	CESSNA	*FUNSTON	ADAMS	*SUNNYSIDE
Kdg	WA	5.33	7.26	5.93	7.06	4.66	5.67
	V	2.42	3.38	3.49	3.30	3.04	4.09
	M	3.54	4.53	4.53	4.04	3.24	4.90
Grade 1	Wa	7.16	6.78	6.57	7.32	7.97	7.19
	V	5.42	5.78	4.71	6.19	6.74	6.77
	R	10.54	9.98	9.61	11.63	10.17	11.71
	M	4.81	3.92	3.73	4.77	6.03	5.77
Grade 2	V	5.23	5.39	5.69	6.02	6.52	6.51
	R	10.96	11.77	10.18	11.86	11.64	12.34
	M	5.28	5.26	5.26	5.22	5.45	4.30
Grade 3	V	4.61	5.90	6.09	4.60	5.55	5.03
	R	9.19	9.78	10.00	9.26	9.18	9.00
	L	5.56	5.87	7.46	6.42	6.62	4.95
	M	6.46	5.05	7.31	6.83	6.88	5.93
Grade 4	V	5.88	5.76	6.23	5.75	7.69	5.99
	R	8.78	8.31	10.21	8.72	9.75	9.89
	L	6.80	6.71	6.88	6.16	7.35	7.32
	M	5.08	6.78	6.96	5.93	7.70	5.79

L= Language Usage
M= Math Computation
V= Vocabulary
R= Reading
WA= Word Analysis
* = Control

WICHITA
PUBLIC SCHOOLS

Office of Director

Program Evaluation

(316) 833-4195

March 14, 1990

Dear Parent:

Enclosed you will find a survey regarding the integrated learning system (ILS) which was in your child's school this year. The computer lab was placed in your school on a trial basis to determine its usefulness for teaching children.

Please take a few minutes of your time to respond. A decision will be made soon regarding the continuation of the computer lab and whether to expand the system to other schools. Your input in this decision is important.

Any additional comments you would like to make regarding the ILS computer lab will also be appreciated.

Sincerely,

Carolyn S. May

Carolyn S. May, Director
Program Evaluation

DIRECTIONS

1. Use a #2 soft lead pencil.
2. Circle school, grade level, and sex for youngest child. (Top of form)
3. Fill in yes or no answering for your youngest child in the school.
4. Write any additional comments on the back of this letter.
5. Return survey and comments (if any) in prestamped envelope which is provided.

RETURN BY APRIL 4 '3C

eer

CIRCLE THE CORRECT SCHOOL, GRADE, AND SEX:

ADAMS CESSNA HARRY STREET

My youngest child in this school is in grade: K 1 2 3 4 5

Sex: Female Male

YES 1 NO 2 3 4 5

1. Has your child been enrolled at this school all year?	
2. Have you visited the Integrated Learning System (ILS) computer lab this year?	
3. Do you feel the ILS computer lab has helped your child this year in math?	
4. Do you feel the ILS computer lab has helped your child this year in reading?	
5. Has your child indicated that he/she liked going to the ILS computer lab?	
6. Would you like to see the ILS computer lab continued at your school?	
7. Do you believe the school system should put an ILS computer lab in more schools?	
8. Additional comments may be written on an additional sheet.	

RETURN BY APRIL 4

SURVEY
Integrated Learning System
March, 1990

TO: Staff, ILS Schools

RETURN BY APRIL 6

From: Carolyn May

Please fill out this survey regarding integrated learning systems (ILS). Your input is extremely important to the evaluation of ILS. Thank you.

Carolyn May

School:_____ Grade level:_____

Respond YES or NO

_____ 1. Do you believe the ILS was effective for most of your pupils?

_____ 2. Do you believe the ILS was more effective for some ability groups than others?

IF YES, rank in order of effectiveness (1 being most effective).
_____ a. higher ability
_____ b. average ability
_____ c. lower ability

_____ 3. Do you believe the ILS was equally effective in reading, math, and language arts?

IF NO, rank in order of effectiveness. (1 being most effective).
_____ a. reading
_____ b. language arts
_____ c. math

_____ 4. Do you want to see the ILS lab cor inued in your school?

IF NO, why not?

OVER

5. Did you use the ILS mostly for: (rank order, 1 being most effective)

_____ a. instructional
_____ b. reinforcement
_____ c. remedial

6. Did you receive adequate support from:

_____ a. your principal
_____ b. district administration
_____ c. the vendor

IF NO, please state what could have been improved?

Please use the remaining space to write any comments you have regarding ILS in general and your system in particular.

Return to Carolyn May, ADM CTR
by April 6